SUBJECT: **Geographical Delineation of Fish Tissue and Sediment PCB Contamination in the Bluestone River, Tazwell County, VA**

TO: Bob Burnley, Director

FROM: Larry Lawson, Director Division of Water Program Coordination

DATE: December 12, 2002

COPIES: M. Overstreet, D. Sizemore, A. Pollock, J. Cunningham, F. Campbell, J. Gregory, R. Browder, A. Barron, G. Darkwah

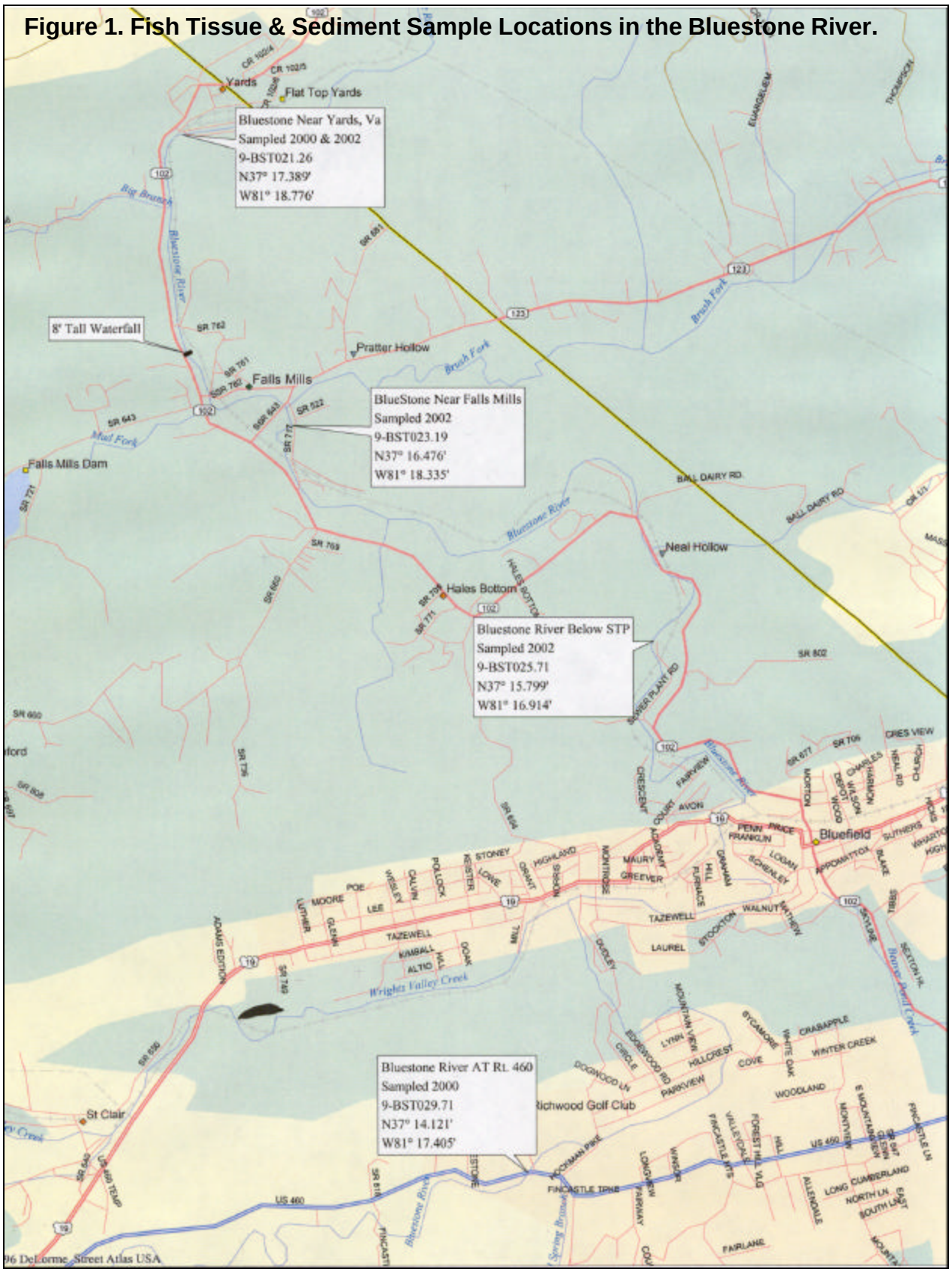
Objective:

The intent of this project is to determine the geographical extent of PCB contamination and potential source(s) of Polychlorinated Biphenyls (PCB's) a toxic contaminant in the Bluestone River below Bluefield, Virginia down river to the Virginia-West Virginia State Line near Yards, Virginia. This area was delineated for a fish consumption advisory by the Virginia Department of Health (VDH) in 2001 based on Virginia Department of Environmental Quality (DEQ) fish tissue data from 2000 (see Table 1). The VDH fish consumption advisory recommends no consumption of carp from the area (see attached). The affected river stretch is approximately 10 miles. The focus of this project is to provide more data at the request of VDH so that they have the necessary information to expand or contract the advisory boundaries and species included in the advisory. In addition, a waterfall in the Bluestone River which acts as a natural barrier to upstream fish migrations and sediment samples collected may help bracket the boundary limits of PCB contamination within the study area.

Justification:

During 2000, the DEQ Fish Tissue and Sediment Monitoring Program collected an edible filet composite sample of 3 Carp with a total PCB concentration of 2369 parts per billion (ppb) near Yards, Va. close to the Va./WVa. State line (see figure 1).

Figure 1. Fish Tissue & Sediment Sample Locations in the Bluestone River.



The PCB concentration observed in carp is among the highest in Virginia waters in recent records and is almost four times greater than the VDH level of concern for PCB in fish tissue (600 ppb). This suggests a potential threat to human health upon which the DEQ Director may determine the need for a source assessment. Other species collected near Yards, Virginia (i.e. white sucker, rock bass, and redbreast sunfish) contained elevated levels in

edible filets but were less contaminated (range 44-62 ppb total PCB) compared to Carp (see table 1). Farther upstream at Rt. 460 white sucker, rock bass, and stoneroller were collected. The total PCB concentrations for edible filet composite samples from this station were relatively low (Range 4.98-29.9 ppb) (see table 1). Carp were not collected at the upstream station since the stream is smaller and more shallow, hence the habitat is less likely to support a large population of relatively large fish species such as carp (R. Browder-personal observations).

The stream segment between Rt. 460 and Yards, Virginia was listed as impaired for fish consumption use in the draft 2002 303(d) Impaired waters list due to the VDH fish consumption advisory.

This project is consistent with the DEQ Toxic Contamination Source Assessment Policy (TCSAP, Jan. 5, 2000) which describes when and how to conduct source assessments for toxic contaminants using the Virginia Environmental Emergency Response Fund (VEERF). The circumstances above represent triggers listed in that document, which indicates the need for source assessment. The Toxic Contamination Source Assessment Policy states …

The decision to conduct contaminate source assessment will normally be done based on one or more of the following circumstances or factors: 1) analytical results of contaminant analysis of fish tissue exceed a Virginia Department of Health (VDH) screening level for a specific toxic contaminant, and the VDH has requested an intensive follow up study to determine the magnitude and geographical extent and potental sources of contamination in fish….

Project Structure:

To delineate the PCB contamination, three stations have been sampled in the lower Bluestone River in 2002. The sample sites going upstream from the state line include; 1) Yards, Va, at Rt. 717; 2) near Falls, Va, and 3) just below the Bluefield Sewage Treatment Plant at Sewer Plant Road (see figure 2). A ten-foot tall waterfall is located between sample stations 1 and 2 and acts as an impassable barrier to fish moving upstream between those stations (see figure 2). The waterfall may help isolate fish populations and help locate the source of contamination. For example, if the fish below the waterfall are contaminated with PCB and the fish above the waterfall are not, then the PCB source must be downstream of the waterfall since fish downstream of the fall cannot migrate upstream of the fall. Two to four fish species and a sediment sample were collected by the DEQ Fish Tissue and

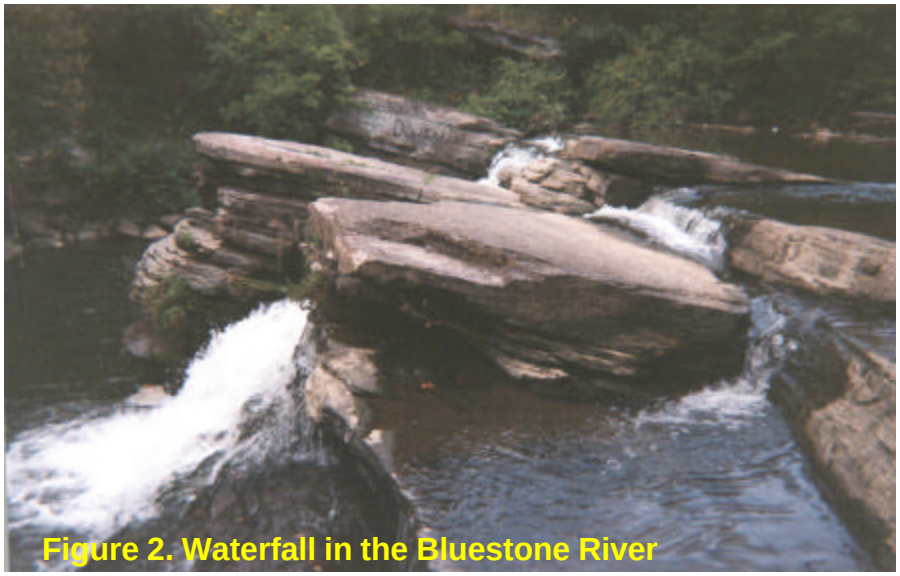


Figure 2. Waterfall in the Bluestone River

Sediment Monitoring Staff in the Summer of 2002. The Virginia Institute of Marine Sciences (VIMS) will perform biota and sediment sample analyses once VEERF funding has been approved. Funds for additional sampling may be requested in the future, pending the 2002 sample results.

Safety Requirements:

General safety requirements will be followed as stated in the DEQ Quality Assurance/Quality Control Project Plan for the Fish Tissue and Sediment Monitoring Program.

QA/QC for Field Sampling and Laboratory Analyses:

DEQ central office staff in standards and biological programs will perform all field sampling covered by this plan. All field quality control samples will be collected in accordance with the DEQ Quality Assurance/Quality Control Project Plan For The Fish Tissue and Sediment Monitoring Program. Split and replicate samples will be analayzed at a frequency of 10%. All samples collected under this plan will be analyzed by VIMS.

Project Scope:

The projected study schedule follows:

February 2002 – Draft Project Plan (Incorporated into the 2002 DEQ Fish Tissue and Sediment Monitoring Plan)

April 2002 – Concurrence on final draft of Project Plan by Central Office Staff, Regional Offices, and VDH.

August 2002 – Collect Fish and Sediment Samples (Approximately Two Day Sampling Event)

December 2002 – Approval of Proposed Project Plan for VEERF funding by Agency Director.

January 2002 – Deliver Samples to VIMS

June 2003 – Receive sample results and report to VDH

June– December 2003 – Assess results. Identify contaminated stations sampled in 2002. Consultation with VDH. Post Data on the DEQ Web Page. Request VEERF funding and conduct further sampling as deemed necessary and dictated by findings.

Responsibility for Specific Study Plan Tasks:

Project Team:

Alex Barron – WQS&BP manager fish tissue and sediment collection, data analysis, and report preparation.

Rick Browder – Sample collection planning and logistics, field collections, data analysis, data management, and report preparation.

Cody Boggs – Field collections.

Gabriel Darkwah – WQS&BP fish tissue and sediment lab liaison, data analysis, and data management, QA/QC, web site production, and report preparation.

Jean Gregory – WQS&BP manager fish tissue and sediment collection. Facilitates comunication and corrdination among, VDH, and DEQ Central Office, and Regional Office Staff.

Dr. Rob Hale – VIMS Lab Director, Data QA/QC, and primary contact for samples submitted to VIMS.

Bill Hayden – DEQ Information Officer. Central Office point of contact for web-targeted information. Central Office contact for reporters and press releases

Brian Hawkins – Field collections.

Griffin Holland – Field collections, equipment procurement.

Costs of Implementation:

The Virginia Legislature has authorized use of the Virginia Environmental Emergency Response Fund (VEERF) for conducting the assessments described here in accordance with DEQ's TCSA Policy (VEERF Policy Statement 2-2001, effective 9/11/2000). Costs budgeted include sampling and analysis for samples:

Total Cost for sampling Oct 2002 – June 2003: **$ 15330**

- **Fish Tissue and Sediment Analysis** ($14830): WQS&BP estimates 25 fish tissue samples at $510 and 4 sediment samples at $520 including QA/QC samples will be required to conduct this study as requested by VDH.

- **Incidentals** ($ 500): A commitment of $500 for equipment , hotel, meals, and micellaneous incidental travel costs for 4 member field crew and approximately two day sampling event.

Any change in the scope of work to include special contracted services or expanded sampling will require additional resources.

Itemized Budget For Bluestone River VEERF Project

Sample Analysis: Fish Tissue Samples Halogenated Organic Compounds, 25 Samples @ $510 each.	$12750
Sample Analysis: Sediment Halogenated Organic Compounds, 4 Samples @ $520 each.	$2080
Travel Costs: hotel, meals, equipment, and incidentals for 2 Day sampling event with 4 field crew members.	$500
Total	$15330

Products:

1. Maps with the following information
   - monitoring locations and contaminate concentrations for fish tissue, and sediments
2. Monitoring and inventory data references
   - existing toxics databases and files
   - historical 305(b), historical 303(d), reports
3. Reports
   - Conclusions that can be made based on the results of investigations
   - Data to VDH and DEQ web site
   - Plans and recommendations for further investigation

DEQ Director Approval:_____Date: _____

Table 1. Summary of 2000 Halogenated Organics Fish Tissue Data for the Bluestone River

									Wet Weight Basis (ppb)		
Sample Date	DEQ River Mile	Location Description	Fish Species	No. of Fish Analyzed	Length (cm)	Weight (g)	Water%	Lipid %	Total PCB	Total Chlordane	Total DD
8/17/00	9-BST021.26	Bluestone River at Rt. 643 Falls Mills	Carp	3	61.9-72.8	3400-7300	66.4	11	**2369**	269	124
8/17/00	9-BST021.26	Bluestone River at Rt. 643 Falls Mills	White Sucker	7	34.5-43.8	468-1034	76.4	1.88	61.7	6.12	3.37
8/17/00	9-BST021.26	Bluestone River at Rt. 643 Falls Mills	Rock Bass	10	16.2-22	80-224	78.9	0.51	49.4	1.98	1.66
8/17/00	9-BST021.26	Bluestone River at Rt. 643 Falls Mills	Redbreast Sunfish	11	14.5-18.1	62-116	78.5	0.88	44.8	2.69	1.69
8/17/00	9-BST029.71	Bluestone River at Rt. 460 Bluefield	Rock Bass	15	15-21	62-194	77.6	0.67	4.98	0.65	0.29
8/17/00	9-BST029.71	Bluestone River at Rt. 460 Bluefield	Stone Roller	17	13.5-17.5	36-64	75.2	3.53	7.79	1.79	0.61
8/17/00	9-BST029.71	Bluestone River at Rt. 460 Bluefield	White Sucker	12	28.1-33.9	238-304	77.4	2.05	29.9	2.37	2.39